Topic 17 – Electrophysiology, rythmology and pacing – B

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0305

Heterogeneous conduction properties in the pig right ventricle

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The right ventricular outflow tract (RVOT) has a distinct embryological origin and is a common anatomical source of arrhythmias in the healthy and diseased myocardium. We hypothesised that specific RVOT activation and conduction properties may underlie the preferential RVOT origin of arrhythmias. Pig right ventricular (RV) wedge preparations were perfused via the left anterior descending and right coronary arteries. Electrical activation and conduction properties were obtained by optical mapping of the epicardial surface (di-4-ANEPPS 10μM) upon electrical stimulation of the preparation. Transmural needles were inserted in the RV free wall and RVOT and unipolar electrograms (EGMs) were recorded. Fiber orientation was obtained by diffusion tensor MRI. Regional mRNA expression was determined by RT-PCR and fibrosis was assessed histologically. Longitudinal and transverse conduction velocities were significantly reduced in RVOT compared to RV free wall (P<0.01). A different direction of propagation was observed in the RVOT compared to the RV free wall and a line of slowed propagation was found at the interface between the 2 regions. This was consistent with a 135±2° change in fiber orientation observed between the 2 regions within a restricted distance (<6cm). The RVOT showed more sites with fractionated EGMs (P<0.01) and more deflections per electrode (P<0.001) than the RV free wall. In line with these findings, a decreased expression of Scna5 and Gja1 was found in the RVOT compared to the RV free wall (P<0.001). Moreover, the RVOT was characterized by an upregulation of type I collagen mRNA, a higher collagen content (P<0.05) and the presence of fat infiltrations which were absent in the free wall.

Conduction is slower in the pig RVOT and is associated with fractionated unipolar electrograms. Conduction slowing was related to (i) reduced connexin and sodium channel expression and (ii) region-specific structural properties which may generate a substrate for RVOT arrhythmias.

0230

Effectiveness of extracorporeal life support for patients with cardiogenic shock due to intractable arrhythmic storm

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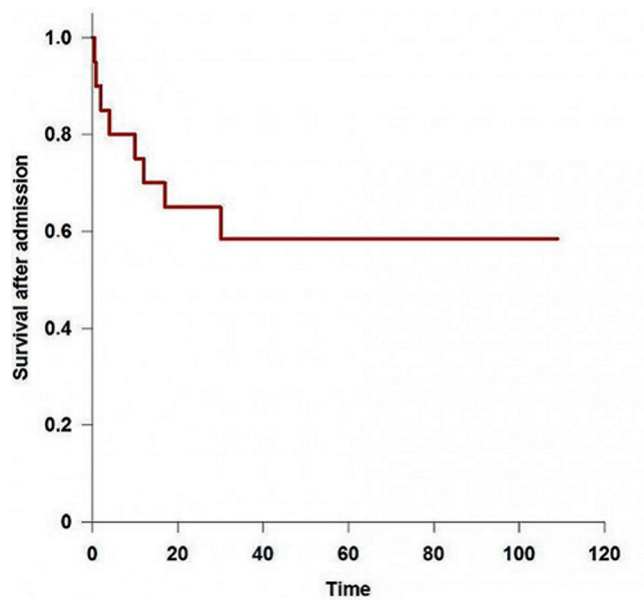
Background: Extracorporeal life support (ECLS) provides mechanical cardiopulmonary support and has been used for intractable heart failure as a bridge to heart transplantation or to recovery. Intractable arrhythmic storm is associated with high mortality. Little is known about the effectiveness of ECLS to treat refractory ventricular arrhythmias responsible for cardiogenic shock in patients non eligible for an urgent ablation.

Methods: Patients with intractable refractory ventricular arrhythmias and cardiogenic shock despite optimal medical therapy, and treated by ECLS implantation were retrospectively included. Patients' characteristics and outcome were analyzed.

Results: 20 patients (53±10 yo) were included. The underlying etiology to the refractory ventricular storm was ischemic cardiomyopathy (75%), short coupled Torsades de Pointes (10%), dilated cardiomyopathy (5%), myocarditis (5%) or unknown (5%). Mean LVEF was 33±17%. An average of 2.3±1.2 anti-arrhythmic drugs was tried before implantation. Arrhythmic storm stopped after a median time of 15min after ECLS implantation. 8 patients (40%) eventually died, none of them because of a complication of ECLS implantation. The remaining 12 patients (60%) had ECLS withdrawn after a median time of 5.3 days, and were discharged after a median time of 29 days after admission (survival curve in the figure).

Conclusion: This is the largest database of patients temporary implanted with ECLS for refractory ventricular arrhythmia responsible for cardiogenic shock and non eligible for ablation. It provides efficient hemodynamic support to these critically ill patients, and survival rate after the implantation is 60%.



Abstract 0230-Figure: Survival curve

0334

Implantable cardioverter defibrillator in primary prevention for chronic heart failure: incidence and predictors of appropriate therapy

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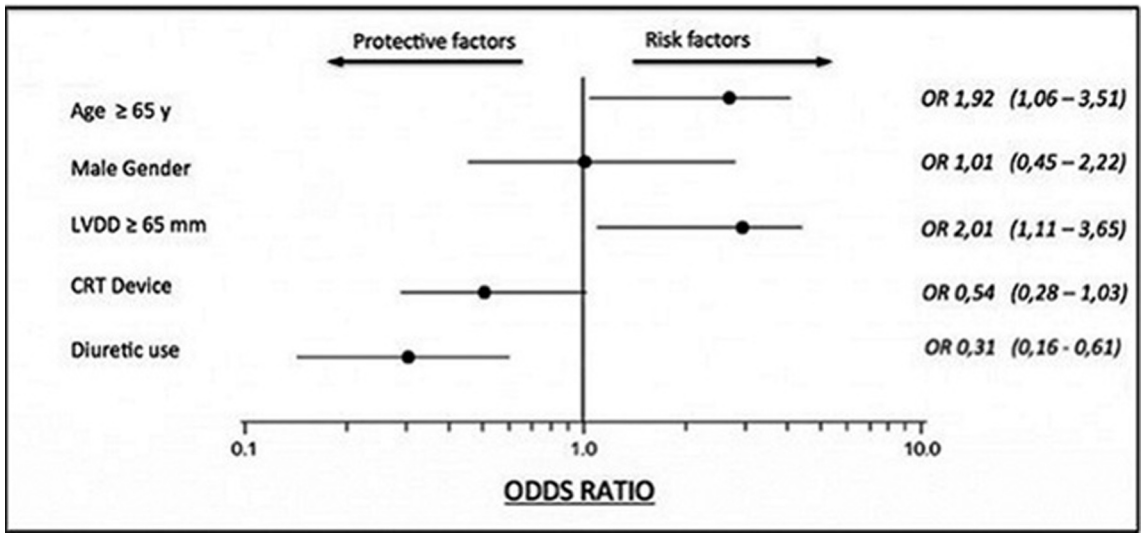
Background: Considering morbidity and financial impact on the health care system, it may be helpful to stratify patients who would most benefit from primary ICD treatment. The aim of this study was to assess the prevalence and identify the clinical predictors of appropriate ICD therapy in patients following implantation of an ICD in primary prevention for chronic heart failure.

Methods: A monocenter retrospective analysis was performed and all patients undergoing implantation of ICD in primary prevention were included. Device interrogations were performed and appropriate therapies, either ATP or shock, were noticed.

Results: Over the 317 primary prevention patients undergoing ICD implantation, 203 had ischemic cardiomyopathy (ICM) and 114 had non-ischemic dilated cardiomyopathy (NIDCM). At the median follow-up time 760±599 days, 56 (17,7%) had received appropriate ICD therapies. Average



Abstract 0334-Figure: Predictors of appropriate ICD therapy

LVEF was 26±6%. By univariate comparison, LVDD≥65mm (p=0,035) and lack of diuretic (p=0,024) were significant predictors for ICD therapy. ICM and NIDCM patients benefit equivalently from ICD implantation (p=0,941). By multivariate analysis, elderly patients ≥65y (HR 1,92, p=0,032), LVDD≥65mm (HR 2,01, p=0,022) and lack of diuretic (HR 0,31, p<0,001) were all significant independent predictors for ICD therapy. Absence of CRT device was closed to be significant (HR 0,53, p=0,062), but was significant in NIDCM population (p=0,007). Onset atrial fibrillation (p=0,027) and hospitalization for acute heart failure (p=0,002) were significantly associated with ICD-delivered therapy.

Conclusions: ICD therapy occurred in 17,7% of primary prevention patients with both ICM and NIDCM. In multivariate analysis, age ≥65y, LVDD≥65mm and absence of diuretic were predictive factors for ICD therapy. Presence of CRT device was closed to be significant. There was no difference by considering heart failure etiology, ICM and NIDCM patients benefited from ICD equivalently.

0340

Predictive factors of appropriate shock therapy in patients with implantable cardioverter defibrillator

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Background: Electrical storm is an increasingly common and life-threatening syndrome that is defined by 3 or more sustained episodes of ventricular tachycardia, ventricular fibrillation, or appropriate shocks from an implantable cardioverter-defibrillator within 24 hours. The clinical presentation can be dramatic Appropriate shock therapy (AST) occurs in the minority of patients with implantable cardioverter defibrillators (ICDs). We assessed which patients received AST and whether there were any predictive factors.

Methods: We retrospectively analysed data from 13 patients implanted with ICDs at our institution who received AST. Stored electrogram data were analysed. Various clinical echocardiographic and electrophysiological variables were studied.

Results: Impaired LV function was the most important factor significantly associated with AST.

Conclusion: Certain pre-procedural variables predict AST. It is important to determinate them to predict which patients will receive shock therapy.

0299

Use of clinical follow-up and pacemaker memories to define predictors of complete atrio-ventricular block or sudden death after balloon-expandable transcatheter aortic valve implantation

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Backgrounds: Predictors of atrio-ventricular block (AVB) after transcatheter aortic valve implantation (TAVI) have been described as those leading to syncope or permanent pacemaker implantation (PPI), and thus have been assimilated to criterias used by the investigators for pacemaker implantation.

Aims: Evaluating the true predictors of AVB following TAVI, using clinical follow-up and devices' memories.

Methods: Between 2011 and 2013, 213 patients without previous PPI underwent TAVI with an Edwards SAPIEN XT balloon-expandable valve using a femoral approach, in our institution. All patients had continuous cardiac rhythm monitoring ≥24 hours after TAVI. ECG was performed the following 2 days after TAVI, and 1 month later. Median follow-up for pacemaker interrogation was 8 months.

Results: Complete AVB occurred in 22 patients (10.3%), sudden death in 8 patients (3.8%). Pacemaker was implanted in 26 patients (12.2%). For 20 of them (77%), pacemaker memories showed complete AVB episodes or ≥2% ventricular pacing, despite the use of a minimizing ventricular pacing algorithm. Results of the multivariate analysis are shown below..

Abstract 0299-Table

	No complete AVB or Sudden death (%)	Complete AVB or Sudden death (%)	Odds Ratio (95% CI)	P
Preexisting RBBB	15 (8)	13 (43)	6.62 (1.7 - 26.3)	0.007
New persistant LBBB	14 (8)	8 (33)	10.1 (2.5 – 41.7)	0.001
1st degree AVB after TAVI	34 (27)	9 (56)	3.48 (1.1 – 11.2)	0.04

LBBB: left bundle branch block; RBBB: right bundle branch block

Conclusions: Our findings confirmed pre-existing RBBB and new persistent LBBB as predictors of AVB following TAVI. We also demonstrated here for the first time, first degree AVB is an independent predictive factor of severe conduction disorders after TAVI.